

From skilled to multi-skilled work: the transformation of skill in the postwar Japanese automobile industry

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Introduction

A catch-phrase in vogue from a government white paper published in 1956 was “The postwar period is over; the period of hunger has gone.” In fact, economic statistics showed that the real amounts of production and consumption per head in 1953 had already surpassed those in the period of 1934 to 1936, which was acknowledged as the highest level Japan’s economic conditions attained in the pre-war period. GNP between 1955 and 1964 rose at annual rates of between 6 and 14 percent, although the decade was marked by two slumps. With intermittent, cyclical recessions, the swift economic growth still continued until the advent of the oil crisis in 1973.¹

New industries, such as the petro-chemical, consumer electrical equipment and automobile industries, established themselves in this period. They led economic development and also benefitted from the increased economic prosperity. Among them, the automobile industry made great strides. In January 1955, the Toyopet Crown, the first Japanese mass-produced passenger car, was put on the market, followed by Nissan and other assemblers’ models in the same year. The Japanese auto makers had at last mastered the technological capabilities needed to build mass-produced cars. The total volume of production for 1955, however, was only 69,000 units, whereas that USA

1 Takafusa Nakamura, *Showa-keizaishi*, (*Japanese economic history, 1925-1985*)1986 pp.211-212.

reached 9.2 million units.² The Japanese industry was running on the fast lane. In 1980 it produced 11 million units, the largest volume in the world, and boasted competitive abilities. In retrospect, in 1948, shortly after the defeat in the war, the industry was able to produce only 20,000 units including commercial vehicles. No other industry apart from automobiles achieved such an astonishing growth rate in only one generation.

Presumably, because of this significant growth in the past decades, many attempts have been made to explore what causes and factors led to this rapid development, both by academics and business consultants from Japan as well as abroad. During the last decade, in particular, some terms such as Toyotaism, Ohnoism, lean production, Japanization and so on were coined as attempts to reflect the growing significance of Japanese methods, mostly focused on the automobile industry.

Their approaches are not necessarily similar but they have one thing in common. They have quite naturally devoted themselves to studies of the success story, taking up mainly the period after 1960. In my contribution for this session, I will rather concentrate on the period of the late 1940s and 1950s, which ushered in such a period of spectacular development afterwards. It was in the fifties that a company like Toyota established a firm foundation which enabled it to make astonishing strides in mass production in the sixties.

Equally, it was in the period of the late 1940s and 1950s that the management made a crucial attempt for rationalising the shopfloor management, which resulted in breaking down old-type, versatile manual skills and creating a new type of skill, namely, a multi-functional skill, which was expected to engage in multi-tasks or jobs with flexibility. I will take up this attempt by Toyota in order to illuminate the nature of skills in the post-war Japanese industrial world. First I will shed light on why and how the management started the rationalization of the shop floor, and then examine why the management succeeded in this attempt. Finally, I will consider the implications of this transformation of skills in relation to the roles of management, enterprise unionism and industrial relations.

1. Why and how did management carry out the rationalization of the shop manage-

² Hiroshi Itami, et al., *Kyoso to Kakusin (Competition and Innovation)* 1988, p.4. M. Kusumano, *The Japanese Automobile Industry, Technology and Management at Nissan and Toyota*, 1985.

ment?

The rationalization of the shop management in Toyota took the first step as early as in 1948. It led to an innovative work organization and a new type of skill, which were to be important elements of the Toyota production system. Before taking up the story of this rationalization, it is useful to briefly look at the business environment at the time in which Toyota operated.

Business Environment

When the war ended in August 1945 the Nation's industrial hartland lay in ruin and industrial output had dropped to one-tenth of the pre-war level. Retail prices tripled by early 1949. The business environment which confronted automobile manufacturers was harsh and discouraging. They suffered from a shortage of capital, raw materials, parts and components and an economic rundown in related industries.

Furthermore, until June 1947 they were not allowed by the General Headquarters of the Allied Forces (GHQ) to produce cars. GHQ only allowed them in September 1945 to produce 1,500 trucks a month in order to ease and assist internal transportation. It was not until October 1949 that these restrictions by GHQ to automakers were withdrawn, and from June 1947 to that time the annual volume of car production was limited to 300 units.³

This change in the policy of GHQ to automakers represented the transformation of the occupation policies. Owing to the development of the cold war and an increased realization that severe restrictions on Japanese industry had caused only economic chaos, which would make Japan a burden to US taxpayers, GHQ redirected its policies at the beginning of 1948 towards fostering a revival of Japanese industrial recovery and development.

The Japanese government, against the background of the shift of the occupation

³ Shogo Amatani, *Nihon Jidosha Kogyo no Shiteki Tenkai (Historical Development of the Japanese Automobile Industry)* p.83, Shoji Okumura, *Jidosha (Automobiles)* 1954, pp.202-4.

policies, laid out in October 1948 a five-year recovery plan for the automobile industry, with the intention that all motor vehicles supplied during the period of the plan should be produced domestically. At the same time, automobile industrialists, after a year of requesting, obtained a promise from the government that priority would be given to auto production in the allocation of resources. Thus just as the industry appeared to be moving towards reconstruction, it was hard hit by the severe deflationary policies introduced in the beginning of 1949.⁴

In November 1948 the GHQ had already proclaimed that the economy should be stabilized and that loans and subsidies to industry which might impose a heavy burden on the public finances should be forbidden. The special envoy, from the US government, Mr. Dodge, a banker, was sent to Japan in early 1949 to stop the spiralling post-war inflation. He did his job well and the depression came. Bankruptcies and unemployment soared.

The automobile industry suffered the twin blows, too. The industry was cut off from loans, particularly from the Reconstruction Finance Bank. At the same time, demand dropped suddenly. For Toyota, one of the biggest automobile firm, faced impending bankruptcy at the end of 1949, and the following months of early 1950 they experienced a period of bitter industrial strife. These experiences Toyota had in the crisis during the 'Dodge' depression provided them with an invaluable lesson, which gave the impetus to create the Toyota production system. I will focus more closely on Toyota's experiences.

Towards creating a multi-skilled job

In November 1948, when the GHQ demanded that Japanese economy should stabilize and industry should not be dependent upon subsidies and loans, Toyota anticipated the harsh economic conditions to come. They set up a business-rationalization committee to cut costs, save business resources and raise productivity. The committee consisted of not only senior management executives, department and section managers but also Toyota union officials.⁵

4 Toyota Motor Company, *Toyota Jidosha 30-nenshi (Thirty Years of the Toyota Motor Company)* 1967, pp. 283-4.

5 *Thirty years of Toyota*, p.271

Taiichi Ohno, the manager of the transmission and suspension shop, was one of the committee members.⁶ He attempted to standardize mechanics' work in his shop, rationalize the work organization, then to create multi-tasked jobs, and finally succeeded in all of his attempts. How were these carried out?

Ohno, at age 20, began his career as a production engineer at the Toyoda spinning and weaving co. in 1932. He moved to Toyota (Motor Co.) in 1943 when Toyota absorbed the textile company. As soon as Ohno joined the auto company, he took charge of revising standard operation sheets, concentrating on cycle times and process routing, to make it easier for unskilled workers to perform more efficiently.⁷ In the midst of the war, an increasing number of unskilled or female labourers had replaced skilled men who had gone to the front. Ohno recalled that the use of standard operation sheets was badly needed at that time.⁸ Furthermore, he was in an advantageous position to compare the ways in which people were doing things to make automobiles with the ways used to make cotton thread. It is significant to note that he was familiar with the production management techniques of the cotton industry, because the industry had developed the most sophisticated management techniques in pre-war times.

When he was appointed as manager of one of the machine shops, the transmission and suspension shop in 1947, he found workers at distinct stations each specializing in a single machine tool, such as lathe processing, milling, boring and so on. Whereas in the cotton industry female workers had operated a number of machines simultaneously. Hence, by simply introducing the production system adopted by his former company, it would be easy to raise productivity of the automobiles by three to five times. That was his idea. He asked for workers to operate two machines rather than one by placing machine tools in parallel lines or in "L" formation. Thus his first attempt to make workers operate more than one machine started.⁹

Between 1948 and 1950, Ohno, who was now promoted to machine shop manager, attempted to rationalize the work at the machine shop, and this developed into the creation of multi-functional or multi-skilled labour. In 1948 Ohno and his staff set out to

6 *ibid.*

7 Kusumano, *op. cit.*, p.272.

8 Taiichi Ohno, *Toyota Seisan Hoshiki*, (*Toyota Production System*)1978, p.40.

9 Kusumano, *op.cit.*, p.273, Takahiro Fuzimoto and J. Tedd, 'The UK and Japanese auto industry: adoption and adaptation of Fordism', paper presented to Gotenba Conference, January 1993, p.27.

analyze each job routine and each machine, and to eliminate “waste” in operations. What Ohno intended was to redistribute worker motions and cycle times to eliminate idle time for a series of workers and then either remove one or more of them.¹⁰

Both in 1949 and 1950 he tried to make workers operate three or four machines. This attempt was different from the former one because the workers were requested to operate a different types of machine tools. Equally he had tried to change the work organization at one of his shops, the transmission and suspension shop. Prior to his arrival in this shop, the shop had been organized by same types of machine tools, eg: lathes, boring, milling and grinding. He tried to convert this layout to another one in which each machine was laid out according to process sequence for a particular product group—a product focused layout. The other shop, the engine machining shop had already been organized according to the production flow.¹¹ Therefore, his attempt to make the worker operate three or four machines at the same time, by arranging the machines in a horseshoe or rectangular configuration according to the series of processes in the production flow, brought about a breakdown of workers’ specialities in specific types of machines. At the same time, it meant a breakdown in the traditional culture of skilled men. It took two years for Ohno and his staff to convert the work organization to the new system. By 1953, one operator was able to manipulate at least ten different machine tools.¹²

It should be noted that this development of a flexible workforce was fostered by various devices of management. First, handles from machine tools and jigs that required workers to hold on to them continuously were removed, and were replaced with pneumatic or hydraulic chucks to keep work in place while freeing the hands of the operators. Second, limit switches were added to machines to turn them off automatically when they had completed an operation. Third, lubrication for machines was centralized so that machine operators did not have to lubricate each machine constantly. Fourth, a section, to grind machine tools was set up instead of the work being done by operators, and this machine tool room delivered tools to workers just as they were finishing an operation,

10 Kusumano, *op.cit.*, p.271.

11 Kusumano, *op.cit.*, p.274, Fujimoto and Tedd, *op.cit.*, Kazuo Wada, 'The emergence of the flow production methods in Japan, 'a paper presented to the Fuji Conference, January 1994. p.23.

12 Ohno, *op.cit.*, p.58. Wada, *ibid.*

eliminating the need for workers to leave their work stations.¹³

Thus a multi-skilled labour system was produced through the several efforts of Ohno and Toyota management as they aimed at standardizing and rationalizing work processes. The rationalization of the shop management had kept in step with the development of multi-functional workers, which made on-the-job-training indispensable. The skills that a multi-functional worker possessed were nurtured in the workplace. The foremen(kumicho) played a key role in this training system.

The foreman was placed in charge of implementing training programmes to develop multi-functional workers. He had to divide up the work process for which he was responsible and assign tasks to the individuals under his direct supervision. According to the number of trained men he would need in a certain period for each job, he formulated training plans, with due consideration for their competence and seniority. Through these training schemes, it was the foreman who could ascertain how many workers had achieved his training targets and also what stage of development each worker had attained. Therefore, when asked by the Personnel Department about the transfer of workers to other shops or factories, so as to meet production fluctuations, the foremen were in a strong position to judge who should be moved and the Personnel Department simply monitored whether the foreman's choice was appropriate or not.¹⁴

It is interesting to note that foremen and the heads of work groups(Hancho) came to be appointed by head office by 1953-54. Prior to that time, they had been assigned by the shop managers.¹⁵ A strong move towards centralization in personnel management was under way.

2. Why did Toyota succeed in the transformation of skills ?

It seems several factors combined with each other to contribute to the transformation of skills in the late 1940s and early 1950s at Toyota. Taichi Ohno recalled that it would be difficult for American managers to do the same thing as he had done at Toyota;

13 Kusumano, *op.cit.*, p.274.

14 Keimei Yamamoto, 'Nihon-teki Koyokanri o Kizuuta Hitotachi' (The Japanese style of management and people who contributed to the establishment of the system) in *Nihon Rodo Kyokai Zasshi*, Vol.24, Nos.7,8, and 9. pp.28. 33.

15 *ibid.*, pp.26-27.

American workers established different unions and job classifications for dozens of specialities, which made it difficult for managers to adapt their workforce to changing production requirements.¹⁶

The issue of union structure is important. Japanese workers had little tradition of craft and industrial unionism. When the labour union law was enacted in December 1945, Japanese workers, for the first time since Japan's industrialization, had the legal right to organize, to engage in collective bargaining and to strike. By June 1948, at the end of the 'reform' era which was introduced by changes in occupation policy towards the labour-union movement, there existed 33,900 unions and their membership had leaped to 6 million. The workers in Japan organized themselves into enterprise unions. As one Toyota worker put it, 'No one had any doubt that the proposed union should consist only of his fellow workers in the plant'.¹⁷ It can be said that his remark reflected the fact that internal labour markets were extensively developed in Japan, at least, in larger firms. Bargaining about employment and working conditions had always been done on a company basis and it was only in the workplace that workers identified a need for solidarity to protect their common interests. Industrial workers never had any solid external organizations to protect their rights to a trade or job. In enterprise unions membership is limited to the regular employees of a particular enterprise. Workers who are not regularly employed in the same firm are not eligible for membership. At the same time, in general, both blue-and-white collar workers are organized in a single union, and union officers are elected from among the regular employees working for the same company, and during their tenure in office, they usually retain their employee status.¹⁸

Although the enterprise union appears to resemble the local of an industrial union in the U.S.A., there are essential distinctions between them; the enterprise union is a unit in, and of, itself; it is not merely an administrative component of a national union like the local industrial union.¹⁹

Equally the enterprise unionism is distinguished from the craft or industrial unionism. First, formalized job control of the workplace is negligible. On the other hand,

16 Ohno, *op.cit.*, pp.21-22, Kusumano *op.cit.*, p.273.

17 Quoted from Tomihisa Suzuki, 'Sengo-10 nenkan no Toyota Roshikankei no Tenkai' (Toyota's industrial relations 1945-55) in *Atarashi Shakaigaku no tameni (For new Sociology)*, September 1983 p.38.

18 Taishiro Shirai. (ed.) *Contemporary Industrial Relations in Japan*, 1983, p.119.

19 Solomon B. Levine, *Industrial Relations in Postwar Japan*, 1958. pp.99-91.

the employment security rights of regular employees are defended to the last. Employment security is taken for granted as a vested right of regular employees. Secondly, it is only the conditions of regular workers that the union will try to improve, because temporary and seasonal workers are not union members. Thirdly, employees tend to have notions that their interests depend crucially upon the prospects and prosperity of the company for which they work. Taking these characteristics of enterprise unionism into consideration, Ohno's remarks can be understood; 'Even in Japan, challenging the conventional ways of production management caused hostility from workers. But you can accomplish it if you really want to.'²⁰

Among many features of enterprise unionism I would like particularly to emphasize that blue-and-white-collar workers in a company are organized in a single union and, hence, supervisors were organized into the same union as the rank and file workers. Moreover, the supervisors played a leading part in the union's activities. A great number of shop stewards were foremen. Thus the dual role these supervisors carried out, both as union representatives and as lower level management, can be seen. The shop stewards were expected to draw up various kinds of demands and grievances from their men and convey them to the shop-steward committees, and in order to do this, the stewards held meetings at the shop once a month to discuss such issues as wage increases, manning, working conditions, and so on. Ohno himself was elected an executive official and sat on the executive committee of the Toyota union from February 1947 to March 1948. He had been promoted to manager of the transmission and suspension shop but postponed this promotion in order to carry out union activities.²¹ It is also the case in larger Japanese firms that capable and enthusiastic persons, like Ohno, are elected union officials and later in their career at the company may be promoted to a senior managerial position.

Furthermore, I would like to emphasize the fact that immediately after the end of the war the Toyota union had a policy which was a curious mixture of confrontation and cooperation with management. As to cooperation, their attitudes were to promote production and reconstruct the industry to which they belonged. In fact, the idea of industrial reconstruction was a pervasive ideology which influenced postwar-labour

20 Ohno, *op.cit.*, p.22.

21 Kusumano, *op.cit.*

circles in varying degrees. As for confrontation, the union claimed their say in business management by building up a central works council in the firm, driven by a spirit of democracy and egalitarianism. The works council, consisting of senior executives and senior union officials, met 125 times from April 1946 to April 1950, when the 1950 industrial dispute occurred, and dealt not only with matters concerning working and employment conditions but also production and personnel management.²² However, the ideas of industrial reconstruction in which the union should take the leadership ebbed away with the shift of the occupation policy towards fostering a revival of Japanese capitalism. From early 1948, the tide began to change in favour of management.

The management had been careful to maintain the cooperation of the union in the reconstruction of the company. As has been mentioned before, senior union officials were on the list of the rationalization committee which was set up in October 1948. However, the management appear to have become confident, proposing to the union that middle managers such as section managers should be excluded from the union membership. They would have recognized that they could deal with the union without the agency of these middle managers. Moreover, the union membership of section managers would have become an obstacle for senior management in their pursuit of rationalization. The union, however, rejected these proposals because they had reaped many advantages from the knowledge of their white-collar members in matters of day to day management (It was in 1956 that the union finally agreed to this proposal). Although Ohno and the management finally achieved success with their project, the five-year rationalization plan, they encountered many obstacles. Ohno recalled that workers hated the technique of operating several machines at once. In particular he met considerable resistance from workers when he began switching to his new attempt at operating several different types of machine tools.²³ The 1950 industrial strife, which continued for two months from April 1950, seems attributable to the management. The management won and put themselves in an advantageous position. The 1,700 redundancies included all communists and many activists.²⁴ This enabled the management to get rid of those who were standing in their

22 Toyota Labour Union, *Kagirinaki Zenshin - 30nen no ayumi (Thirty years of the Toyota Union)* 1976, p.2. *Thirty years of Toyota*, pp.262-3, 298.

23 Kusumano, op.cit., p.306

24 *Twenty years of Toyota*, pp.304-313, *Thirty years of Toyota*, pp.292-313, *Ten years of Toyota Union*, pp.73-76, 77, *Twenty years of Toyota Union*, pp.21-33, 35.

way.

3. Concluding remarks

Through the previous sections we have examined how and why Toyota management carried out their attempts at rationalizing the workplace and how they succeeded in their attempts. It also has been emphasized that the development of work standardization went with the production of multi-tasked machine operators. The traditional skill was replaced by the multi-functional skill.

While many researchers have concentrated their efforts on the issue of the Toyota production system, a very few have focused on this transformation of skill. Among the few, Wada has pointed out, rightly, the significance of skill formation that was intended by Ohno; 'multi-task operation by a single worker was essential for creation of a flow of production..... But even if the company successfully changed work organization into a 'product-focused' layout, this would not result in increased productivity. ... The product-focused layout could be beneficial to the company only if the workers handled several different kinds of machines'.²⁵ His observations on the creation of flow production combined with multi-skilled work are important. When we contrast Ohno's, hence, Toyota's conception of flow production with that of Henry Ford, who invented his flow production system in the first decade of the 20th century, we can differentiate the one from the other as follows; although both intended to create the flow of materials which followed the sequence of operations in production processes, Toyota's system created multi-skilled workers, whereas Ford's system created an increasing proportion of unskilled workers on the line, assigning sub-divisions of tasks.

We have seen that the creation of multi-skilled work was indispensable to rationalise the production processes from the late 1940s onwards at Toyota. The transformation of skills at Toyota originated in an alternative managerial method introduced by a production engineer, Ohno, who confronted the problems of reducing costs and raising productivity. Under the conditions of a shortage of financial resources and small runs in production he took steps to rationalise workers' activities and the work organisation by making the workers handle multi-machines and multi-different-kind-of

²⁵ Wada, *op.cit.*, p.23.

machines in a flow production²⁶. Thus a multi-skilled worker was produced, who could sustain flexibility in production to meet the diversity of demand as well as market fluctuations. His skill was produced by on-the-job-training and bears an enterprise-specific-character.

Regarding the issue of skill transformation, Fujimoto has expressed it as follows: 'Toyota in the late 1940s replaced traditional craft jobs with multi-skilled jobs. ... It should be noted that multi-skilled workers are different from traditional craft people; the former did a series of standardized tasks along the process flow; the latter were all round players who did everything related to their trade regardless of process flow or work standard.'²⁷ These differences which he has described seem plausible. However, it is important to note that at least in the machine shop not everyman was a craftsman. Ohno found that men were operating only one single machine, in which they specialized. There is still ample room to be studied on the nature of skills in the period concerned here.

At the same time, we should keep in mind that the technological innovation that was realised by colossal investment contributed to the fostering of multi-skilled workers. As early as October 1945 Toyota management had started to repair their bomb-damaged plants and resumed production for trucks in March 1946. They continued to refurbish and remodel plants relying heavily upon loans from government sources.²⁸ The Korean war, which broke out in June 1950, was a panacea for the recovery of the economy. Toyota invested huge sums of money to realise their long cherished dream of full commercial production of small-sized passenger cars. Over the 1950s the total investment into plant and equipment amounted to ¥24,837 millions.²⁹

Keeping step with the development of technological innovation as well as that of multi-skilled work, there was a shift of managerial strategies from indirect to direct management of human resources at the workplace. The strategy of direct management of labour-and-production by the management meant that they had to take over the

26 As has been pointed out before, Ohno's career as a production manager should be noted. His intention of producing multi-skilled worker in machine shops developed from his experience working in the cotton industry.

27 Fujimoto, op.cit. P.

28 By November 1948 the accumulated loans amounted to 782 million yen, which was eight times the company's capital., *A History of the First 50 years*, 1988.

29 *Thirty years of the Toyota*, p.

functions hitherto performed by the senior foremen, highly- skilled men (Kocho as well as Kumicho). In the early 1950s, white-collar employees assigned to the shopfloor were given a much wider range of functions in the fields of labour and production management, and at the same time, senior foremen and foremen on production were restricted to monitoring and instructing the men working in the production processes. As has been mentioned before, until 1953-4 the foremen and the heads of work groups (Hanchō) had been assigned by the shop manager but they now came to be appointed by head office. A strong move towards centralisation in human resources management was underway.

Finally I would like to emphasise that Toyota management had great organisational capabilities in integrating their employees into activities planned by the company. After their victories in industrial strife of the early 1950s, Toyota management tried to improve management-employee relations. They developed human relations techniques and instituted reforms in payment and promotion systems. As I have examined the development of this human resource management elsewhere, suffice to say that the Shokuso seido, the newly established wage payment system of 1969 based on qualification grades of employees, played a significant role in fostering commitment to the firm by the employees.³⁰

Under this system, every individual employee was ranked through assessment by management and given a specific grade representing a qualification for specific positions. The employee was to be paid corresponding to the grade he was ranked in, irrespective of the job he performed. Toyota management found this grading system to be most consistent with the development of multi-skilled workers and the flexible use of manpower. As for the worker himself, he could have a chance to climb up the promotion ladder step by step, and improve his ability to cope with many jobs, through internal mobility within the company he worked for.

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30 R. Okayama, "Industrial Relations at Toyota, 1945-70". in ed., S. Tolliday and J. Zeitlin, *The Automobile Industry and Its Workers.*, 1986, pp. 182-84.